

# (12) UK Patent Application (19) GB (11) 2 296 031 (13) A

(43) Date of A Publication 19.06.1996

(21) Application No 9425424.0

(22) Date of Filing 16.12.1994

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(51) INT CL<sup>6</sup>

F16B 19/10

(52) UK CL (Edition O )

E2A A107 A110 A175 A177 A408 A423

(56) Documents Cited

GB 2054785 A

EP 0415509 A1

US 5370484 A

US 4312614 A

(58) Field of Search

UK CL (Edition O )

E2A ACAT A175 A177 , F2H HARM

INT CL<sup>6</sup> F16B 19/04 19/10

(54) Tamper-evident plastic rivet or plug lock fastener

(57) A tamper-evident one-piece plastic rivet or plug lock fastener comprises a flexible head 30 connected to an elongate U-shaped body 31 with radially-expandable arms 34 by means of frangible webs 35. An inner locking member 36, connected to the head via a frangible web 39, extends axially of the body 31 between the arms 34. In use, the arms 34 are permanently locked in their radially expanded position by applying pressure to the head 30, so as to axially displace the locking member 36, thereby forcibly engaging an enlarged portion of the locking member 36 with a restriction 38 formed between opposite arms 34 of the body 31.

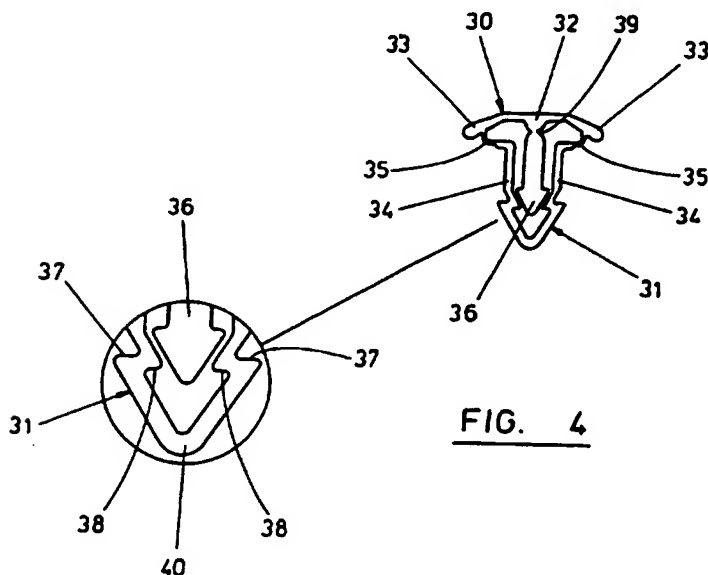


FIG. 4

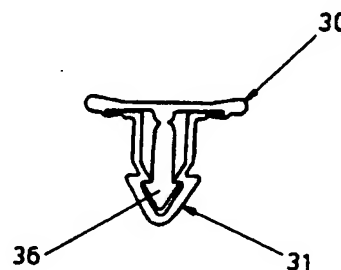


FIG. 5

At least one drawing originally filed was informal and the print reproduced here is taken from a later filed formal copy.

The claims were filed later than the filing date within the period prescribed by Rule 25(1) of the Patents Rules 1995

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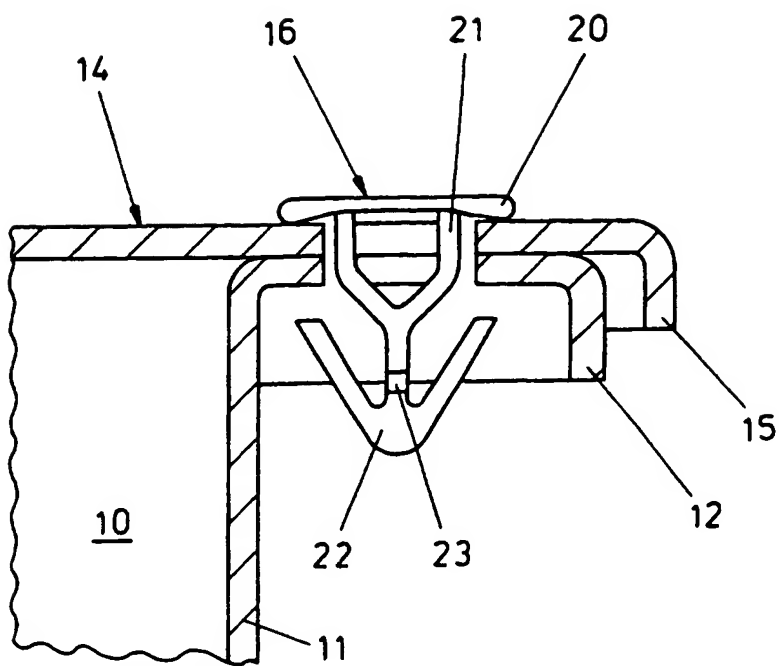


FIG. 1

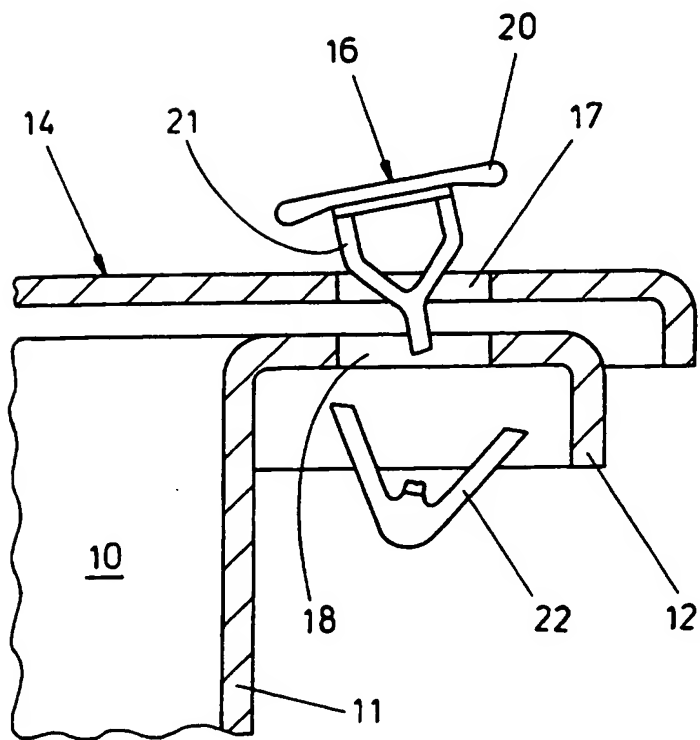


FIG. 2

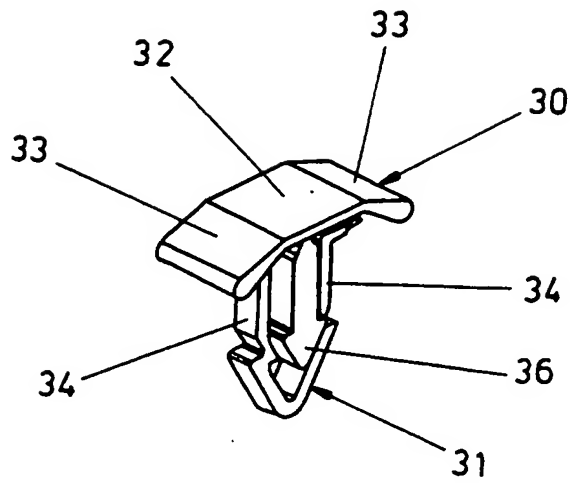


FIG. 3

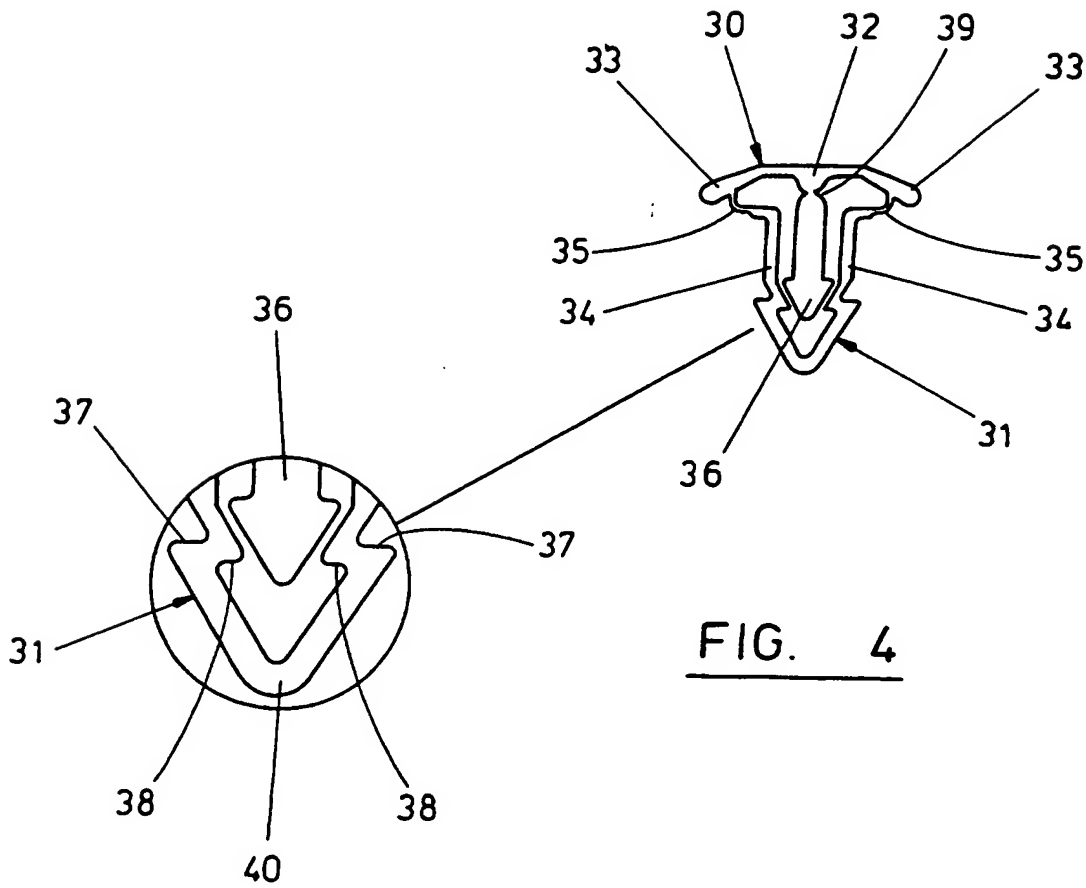


FIG. 4

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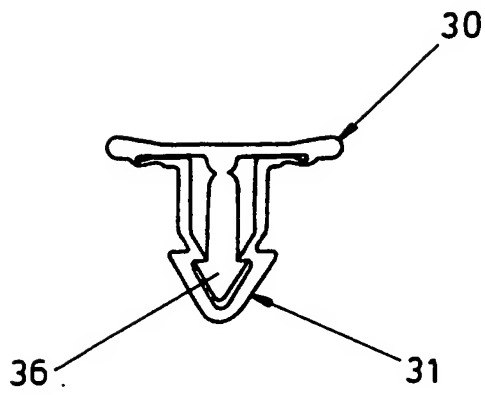


FIG. 5

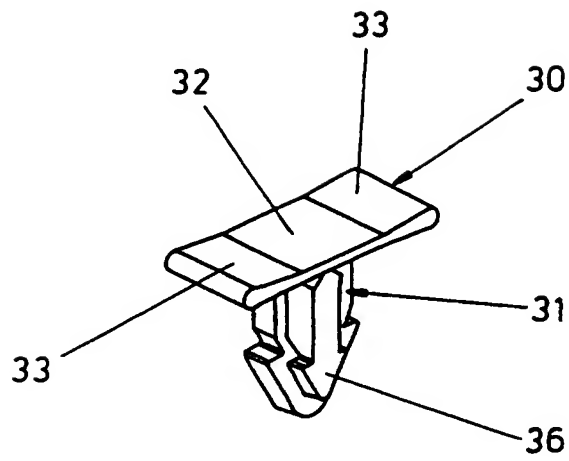


FIG. 6

FASTENER

This invention relates to a fastener and more particularly, but not solely, to a so-called plug-lock fastener.

Plug-lock fasteners are well known for fixing two panel members together. One such plug-lock fastener is arranged to seal a closure on a small plastics shipping container, so that the closure does not become detached, and so that an unauthorised person cannot readily open the container. The fastener comprises an enlarged head and a projecting body portion which carries at least one pair of resiliently flexible barbs at its free end. In use, the barbs are pressed through aligned apertures in the closure and in a projecting peripheral flange on the container. The barbs expand radially outwards once the fastener is fitted, so that the fastener cannot be pulled back through the aperture. The head is attached to the body by a frangible web which breaks if an excessive pulling force is applied to the head or body, say when the closure is fitted. In this manner it is relatively easy to open the closure, but the broken fasteners will show that the container has been opened. This arrangement of the fastener provides a tamper evident feature for the container.

A disadvantage of such plug-lock fasteners is that it is relatively easy for a would-be thief to compress the barbs and remove the fastener in one piece. The fastener can then be replaced after the contents of the container have been stolen or tampered with.

We have now devised a fastener which alleviates the above-mentioned problem.

In accordance with this invention there is provided a fastener comprising a head, an elongate body projecting from the head and having a portion movable between an expanded and a contracted state, and a locking member, the locking member being movable axially of the body in order to permanently lock the latter in said expanded state.

In use, a would-be thief cannot remove the fastener without breaking it, owing to the body of the fastener being

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permanently locked in its expanded state.

Preferably the fastener is formed from moulded plastics. Preferably the fastener comprises a one-piece moulding.

5        Preferably the fastener comprises a frangible portion which can be broken to remove the fastener: this frangible portion provides a tamper-evident feature for the fastener.

Preferably the body is attached to the head by said frangible portion, such that the body is broken away from the  
10 head when the fastener is removed.

Preferably the body comprises outwardly projecting barbs which are movable between said expanded and contracted states.

Preferably the body is hollow, the locking member being  
15 arranged inside the hollow body, so that it is difficult to gain access to release the locking member.

Preferably the body is U-shaped. Preferably the locking member is arranged between opposite arms of the U-shaped body, the head being flexible so as to permit axial  
20 movement of the locking member with respect to the body.

Preferably the locking member comprises an enlarged portion which engages with a restriction formed between opposite arms of the U-shaped body when the fastener is locked, so as to expand the arms outwardly.

25        Preferably the engaging portions of the locking member and the U-shaped body snap-engage to permanently lock the fastener in said expanded state.

An embodiment of this invention will now be described by way of example only and with reference to the accompanying  
30 drawings, in which:

FIGURE 1 is a sectional view through a container fitted with a conventional fastener;

FIGURE 2 is a sectional view through the container of Figure 1 when the container is partially opened;

35        FIGURE 3 is a perspective view of a fastener in accordance with this invention;

FIGURE 4 is a side view of the fastener of Figure 3;

FIGURE 5 is a perspective view of the fastener of Figure 3, shown in its fastened condition; and

FIGURE 6 is a side view of the fastener of Figure 5.

Referring to Figures 1 and 2 of the drawings, there is shown a conventional moulded plastics shipping container 10. The container is generally rectangular in shape, with a base 5 and four walls 11 and an opening in its top. A peripheral flange 12 projects outwardly around the opening in the container. A flat plastics closure 14 having a peripheral depending flange 15 around its edge rests on the peripheral flange 12 of the container when the latter is closed. The closure 14 is fixed to the container 10 by means of fasteners 16 which are pressed through apertures 17 in the closure 14 that line up with complementary apertures 18 in the container flange 12.

The fasteners 16 comprise an enlarged head 20 connected to a body 21 which carries a pair of resiliently flexible barbs 22 at its free end. The barbs 22 project outwardly and rearwardly towards the head 20, and prevent the fastener from being removed once it has been fitted to the container. The body of the fastener comprises a frangible portion 23 which is arranged to break if an excessive pulling force is applied to the head 20, say when the closure 14 is lifted to open the container, as shown in Figure 2. Once the fasteners have broken the container can be opened. If any fasteners are missing or broken, then this will show that the container has been tampered with.

Hitherto it has been relatively easy for a would-be thief to compress the barbs 22, using pliers, and remove the fastener in one-piece. The fastener can then be refitted to the container once the contents of the container have been tampered with.

Referring to Figures 3 and 4 of the drawings, there is shown a one-piece moulded plastics fastener in accordance with this invention. The fastener comprises a flexible head 30 and an elongate body 31 which projects from the head. The head 30 is rectangular in shape and is divided up into a central portion 32 and opposite, downwardly inclined end portions 33.

The body 31 is substantially U-shaped with symmetrical arms 34, which are joined to respective opposite end portions 33 of the head by means of frangible webs 35. An inner locking

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portion 36 of the fastener extends axially of the U-shaped body 31 between its symmetrical arms 34, and is joined to the central portion 32 of the head 30 by means of a frangible web 39.

5       The upper ends of the symmetrical arms 34 are generally parallel, and extend inwardly then outwardly at their lower ends to form respective outwardly projecting barbs 37 having abutment surfaces which face the head portion 30: thereafter the lower ends of the arms incline towards each other and meet  
10 at a point 39 at the end of the body 31. This arrangement of the lower ends of the arms 34 also forms opposite, inwardly directed barbs 38 on the inner walls of the arms 34. These inwardly directed barbs 38 form a restriction between the opposite arms 34 adjacent the lower end of the body. The  
15 abutment surfaces of the inwardly directed barbs 38 face the free insertion end 39 of the U-shaped body 31.

The locking portion 36 of the fastener is parallel-sided with an enlargement at its free end which forms a pair of barbs which are directed towards the head 30. The barbs  
20 taper radially inwardly to form a V-shaped end on the locking portion 36.

Referring to Figures 5 and 6 of the drawings, in use the elongate U-shaped body 31 of the fastener is inserted through the aligned apertures of a container and its closure.  
25 The width of the outer end of the U-shaped body 31 is greater than the diameters of the apertures, and thus pressure has to be applied to the head of the fastener to force the outer end of its body 31 through the apertures. The arms 34 of the U-shaped body 31 are compressed together as they are forced  
30 through the aperture.

Once the underside of the head 30 abuts the surface of the closure, any continued pressure on the central portion 32 of the head causes the end portions 33 of the head to flex and straighten, such that the locking portion 36 moves downwards  
35 with respect to the U-shaped body 31, whereupon the enlarged head of the locking portion 36 is forced into the restriction formed between the inwardly directed barbs 38 on the arms 34: this causes the arms 34 to be forced apart, such that the outer end of the U-shaped body 31 no longer fits through the



apertures in the container and closure. The barbs on the locking portion 36 snap-engage with the respective inwardly directed barbs 38 on the arms 34, thereby permanently locking the U-shaped body in its expanded state.

5       It is not possible for a would-be thief to release the engagement between the locking portion 36 and the U-shaped body 31, owing to their respective engaging portions being concealed inside the U-shaped body.

10       The container can be opened by lifting the closure sharply upwards to break the frangible webs 35, 39 on the U-shaped body 31 and locking portion 36 respectively, such that the body and locking portion break away from the head 30.

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Claims

1. A fastener comprising a head, an elongate body projecting from the head and having a portion movable between an expanded and a contracted state, and a locking member being  
5 movable axially of the body in order to permanently lock the body in said expanded state.
2. A fastener as claimed in claim 1, in which the fastener is formed from moulded plastics.
3. A fastener as claimed in claim 2, in which the fastener  
10 comprises a one-piece plastics moulding.
4. A fastener as claimed in any preceding claim, comprising a frangible portion arranged such that it can be broken to remove the fastener.
5. A fastener as claimed in claim 4, in which the body is  
15 connected to the head by said frangible portion.
6. A fastener as claimed in any preceding claim, in which the body comprises outwardly projecting barbs which are movable between said expanded and contracted states.
7. A fastener as claimed in any preceding claim, in which  
20 the body is hollow, the locking member being arranged inside the hollow body.
8. A fastener as claimed in claim 7, in which the body is U-shaped.
9. A fastener as claimed in claim 8, in which the locking  
25 member is arranged between opposite arms of the U-shaped body, the head being flexible so as to permit axial movement of the locking member with respect to the body.
10. A fastener as claimed in claims 8 or 9, in which the locking member comprises an enlarged portion which engages with

a restriction formed between opposite arms of the U-shaped body when the fastener is locked, so as to expand the arms outwardly.

11. A fastener substantially as herein described with 5 reference to Figures 3 to 6 of the accompanying drawings.

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Application No: GB 9425424.0  
Claims searched: 1-11

Examiner: Robert H Games  
Date of search: 16 January 1996

**Patents Act 1977**  
**Search Report under Section 17**

**Databases searched:**

UK Patent Office collections, including GB, EP, WO & US patent specifications, in:

UK Cl (Ed.O): E2A ACAT; F2H HARM

Int Cl (Ed.6): F16B 19/04, 19/10

Other:

**Documents considered to be relevant:**

Category	Identity of document and relevant passage	Relevant to claims
X	GB 2054785 A (ITW ESPANA) see page 1 lines 68-117	1-3,6-9
X	EP 0415509 A1 (KATO) see Fig 1 and column 5 lines 18-49	1-3, 6-10
X	US 5370484 (NIFCO) see column 4 lines 27-49	1,2,6 & 7
X	US 4312614 (ITW LTD.) see column 1 lines 28-57 and column 5 lines 10-18	1-10

X Document indicating lack of novelty or inventive step  
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A Document indicating technological background and/or state of the art.  
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